D R A F T/[redacted] STAT
9 March 1970

DEVELOPMENT OBJECTIVES
DESIGN CONCEPT FOR A COLOR CONTROL CELL

1. INTRODUCTION

These development objectives describe requirements to be met in the preparation of a Design Concept for a Color Control Cell, a facility providing the proper environment in which to carry out photo interpretation and photo-scientific experiments on a new family of high resolution, color reconnaissance photography taken at very high altitudes.

2. BACKGROUND

2.1. As a result of great improvements in the imaging characteristics of aerial color film in recent months, increasing amounts of such film are being flown for the assessment of color Essential Elements of Information (EEI's) in military reconnaissance. This trend is expected to accelerate in the next several years, as development continues on presently less-than-optimum copy film for reproduction of working copies. It is anticipated that product improvement of both original and copy material--as well as special unconventional sensor records--will continue, necessitating a continuing R&D effort in several categories of color reconnaissance film utilization.

2.2. Specifically, several initial studies are starting in the areas of: (a) Establishing processing, viewing, and reporting standards for color-oriented Essential Elements of Information (EEI's); (b) Developing and modifying equipment to permit optimum copying of photographic color originals; (c) Analyzing the effect of the new color film structure on the

continuing requirement for accurate mensuration of photographic images; (d) Developing a plan for traning all types of personnel who must exploit color photography.

2.3. These studies are not a part of this project; however, progress and findings in each must be correlated with the Design Concept for the color Control Cell (CCC). Similarly, the contractor for the CCC Design Concept will be required to coordinate with continuing efforts of the manufacturer of the new high resolution color films, which involve unique coating and arrangement of film layers. Additional studies will be added, demanding further coordination among contractors, under the control of Government Project Officers.

3. CONCEPT

3.1. Purpose - It is the primary purpose of this study to develop a Design Concept for a facility with which to study the effect of manipulating the environment while conducting PI and photo-scientific tasks. An important sub-task, and perhaps the guiding principle behind the Design Concept, is accommodation for accurate color discrimination (identification). In other words, the CCC should neutralize visual phenomena which would otherwise interfer with accurate film image color identification by the human visual apparatus.

3.2. Scope - This study shall produce a thorough report detailing the results of the contractor's analyses and defining, in general terms, the physical and functional characteristics of the Color Control Cell and equipment therein. This effort will not include Detailed Designs and Fabrication at this time.

4. REQUIREMENTS

4.1. Functions of the Color Control Cell

4.1.1. Environment - The CCC must be usable to conduct meaningful experiments to define and develop optimized techniques for interpreting and analyzing the new families of color reconnaissance films. To achieve such purposes, the selected contractor may determine that illumination (both environmental and insturment) should be "modifiable" as to color characteristics. Similarly, consideration must be given to convertible work space configurations and surface colors to permit testing of theoretical arrangements. In studying this, the response of the human eye and the limits and types of visual anomalies permissable will be considered by the contractor.

4.1.2. Photo interpretation Experiments - The Design Concept for the Color Control Cell shall accommodate ~~intermittant use~~ human factors research and experimentation with existing PI light tables, microstereoscopes, and projection viewers. Eventually, the CCC must permit test and evaluation of certain specialized light tables and rear projection viewers with light sources capable of chromatic manipulation. Such instrumentation is either under development or being considered for funding under separate efforts. In follow-on programs, the impact of the new color films, displayed on the above equipments, will be categorized and studied as to phases of PI activities (detection, identification, interpretation) and target types. Also to be considered at a later time (but affecting the Design Concept) are the relevance and limits of luminance requirements and magnification while viewing color films, and ~~to what~~ the extent to which optics and light sources of viewing instruments must be modified or newly-developed.

4.1.3. Photo-Scientific Experiments - Within the Color Control Cell, numerous objective and subjective color film assessments and evaluations must be made, which are those of the photo-scientist, as opposed to those of the photo interpreter. The Design Concept for the CCC must accommodate expansions of such current evaluations as:

-- Comparative studies between two different camera systems or missions.

-- Changes in images produced by deviations within a mission.

-- Performance comparisons between emulsions, lenses, printers, and processors.

-- System and film assessment of anomalies in resolution, density, contrast, color balance, color saturation, exposure, illumination, obliquity, focus, image motion compensation, astigmatism, chromatic aberration, light leaks, vibration, contaminated processing solutions, chemical precipitation, improper light sources, filtration, magnification.

-- Studies in preparing optimum density/contrast reproductions.

-- Color separation studies and analysis of the interactions between color film layers.

-- Image quality grading studies.

4.2. Color Definition

4.2.1. Standards - The selected contractor will coordinate with a parallel effort under way to establish a system of standards by which photo interpreters can properly identify film image colors in a manner useful for intelligence purposes. A method utilizing the [redacted] Color System, modified for transparencies, is being considered; however, measurement techniques involving Chromaticity Coordinates, Color Rendering Indexes, and Luminance values are also believed necessary. In this way, the Sponsor is planning to

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start from a base defined recently by the USA Standards Institute for viewing and comparing color transparencies in the Graphic Arts and related industries, supplemented by specifications from the Illuminating Engineering Society. From that base, appropriate modifications will be applied for dealing with any special requirements for photo interpretation and photo-scientific analysis and these modifications will be made available for the CCC Design Concept.

4.2.2. Techniques - It is required additionally that the Design Concept formulate techniques by which image colors may be effectively differentiated and identified, in the context of the yet-to-be-established color viewing and reporting standards. Determination of tolerances to which color information should be obtained may well depend upon the optimum method. It is required that consideration be given to both human visual and photo-electric (machine) techniques, even though the foregoing CCC Design Concept emphasizes the visual effects. Equipment candidates for visual techniques include existing PI light tables, microstereoscopes, and projection viewers; versions of commerical photo assessment viewers [redacted] STAT a proposed Visual Tri-chromatic Colorimeter; an existing monoscopic colorimeter design; and optical techniques of split field and "flicker", in general. Among the "machine" techniques, the contractor should consider existing or conceptualized photo-electric colorimeters, densitometers, spectrophotometers, and spectral radiometers. In this area, also, coordination with other on-going efforts in this office will be required. While the selected contractor must consider all these concepts, he should not be limited to them in developing the overall Design Concept.

5. MISCELLANEOUS

5.1. Reporting - The contractor will be required to provide monthly reports and a Final Report. The monthly reports will follow the DB-1001 specification attached. The Final Report will provide a complete Design Concept, upon which a follow-on Detailed Design can be directly based. The Final Report must be completed within 30 days of the completion of the investigations and within the allowable cost of the contract.

5.2. Proposal Format - The submitted proposal will conform to the attached Guide for Proposal Format.

5.3. Level of Effort - It is desired that this study consume no more than four months from contract initiation.

PROPOSAL FORMAT

All Proposals Must Include the Following Information:

I. Task Abstract: Contents - Synopsis of task within 12 lines, plus estimated cost of direct labor, material, overhead, G&A, fee, total.

II. Introduction: Contents - Covering background and task justification rationale.

III. Technical Discussion: Contents - Detail and subsections as a function of the task.

IV. Work Statement: Contents - This statement should succinctly describe the individual tasks to be done and should be sufficiently definitive that one may read this section to understand the purpose and scope of the tasks.

V. Deliverable Items: Contents - 1) Interim and Final reports
2) Equipment

VI. Schedule of the project percentage of completion of performance by months and related schedule of percentage of project expenditures by month in tabular form.

VII. Time Bar Chart

VIII. Financial Considerations: Contents - Cost details, summary, GFE required.

Specification No. DB-1001
Issue Date: 31 August 1966

CONTRACTUAL DOCUMENTATION TO BE SUPPLIED BY CONTRACTORS

1. SCOPE

1.1 This Specification covers the contractual documentation to be supplied by contractors in the performance of Research and Development contracts.

2. REQUIREMENTS

2.1 General - In order to maintain proper control the progress and funding of Research and Development contracts, it is necessary that certain orderly reporting be accomplished by the Contractor on a regularly scheduled basis.

2.1.1 All documentation submitted by the Contractor shall bear the control number assigned by the Contracting Officer's Technical Representative. This control number shall appear on all correspondence, reports, etc., submitted by the contractor under the contract.

2.2 Types of Reports - The following types of reports shall be submitted by the contractor. Specific reports shall include, but not necessarily be limited to, the designated information.

2.2.1 Monthly - A monthly report shall be prepared as of the last working day of each calendar month. The first monthly report shall be prepared as of the last working day of the first full calendar month subsequent to the date of contract. Monthly reports shall be mailed so as to reach the consignee(s), stated in the contract, not later than the first business day after the fifteenth of the month following the reporting period. Each Monthly report shall provide the following, with negative reporting if applicable.

2.2.1.1 A statement of the activity on the project during the month and the percentage of work completed as of the reporting date.

2.2.1.2 A statement of the planned activity for the next month.

2.2.1.3 A statement of pending, unresolved technical problems.

2.2.1.4 A statement of pending, unresolved contractual problems.

2.2.1.5 A statement for the record, of agreements or understandings reached orally during the reporting period on technical matters not requiring the approval of the Contracting Officer.

2.2.1.6 A statement of any proposed change, agreement or understanding which requires the approval of the Contracting Officer. The contractor is cautioned not to proceed in a situation requiring the prior approval of the Contracting Officer until such approval has been obtained. In situations requiring correspondence with the Contracting Officer, a complimentary copy shall be forwarded, simultaneously, directly to the Contracting Officer's Technical Representative.

2.2.1.7 A statement of unanswered, unresolved matters, unanswered correspondence, etc., and whether delinquency is attributed to the contractor or to the Government.

2.2.1.8 Status of funds. The format shown in Enclosure 1 shall be used to report the status of funds. All applicable items shall be reported. If no expenditures or obligations have been incurred for a specific item, the word "None" shall be entered in the space assigned for the dollar amount.

2.2.2 Final Report - The final report shall be submitted to the Contracting Officer's Technical Representative on or before the thirtieth day following completion of the work under the contract. This report shall cover the entire design and/or development work accomplished during the period of performance and shall contain a section covering the work performed under each of the tasks set forth in the Work Statements. The report shall state concisely but completely the major problems encountered, the apparent cause of the problems, the problem solutions and an evaluation of the solutions based on actual application of the solutions.

2.2.3 Installation Engineering Data - Whenever hardware is a deliverable item under a contract the contractor shall provide the Installation Engineering Data requested on Enclosure 2. The Contracting Officer's Technical Representative shall provide the blank forms to the Contractor. Preliminary data shall be submitted to the Contracting Officer's Technical Representative at six months and again at three months prior to the delivery date of the equipment. Final data shall be submitted by the contractor not less than thirty days prior to the delivery of the equipment.

2.2.3.1 The outline drawing, submitted with the Installation Engineering Data form shall show:

(a) the orientation of the equipment within the work area for normal equipment useage.

(b) the exact location of all external connections.

(c) the clearance required around the equipment for access to all removeable panels, doors, etc.

(d) the location of mounting points and type of mounting required.

2.3. Delivery of Reports - All monthly reports and the final report shall be forwarded by the contractor to the Consignee(s) specified in the contract. The contractor shall forward each report in the number of copies specified in the contract.

2.3.1 The Installation Engineering Data form plus the outline drawing shall be forwarded to the Contracting Officer's Technical Representative.

Statement of Funds as of 30 September 19XX (See Note 1)

EXPENDITURES

1.	Labor:		
	a. Total paid as of 31 August 19XX	XX,XXX	
	b. Paid during September 19XX	X,XXX	
	c. Sub-total		XX,XXX
2.	Material:		
	a. Total paid as of 31 August 19XX	X,XXX	
	b. Paid during September 19XX	XXX	
	c. Sub-total		X,XXX
3.	Services (sub-contracts, etc.):		
	a. Total paid as of 31 August 19XX	X,XXX	
	b. Paid during September 19XX	XXX	
	c. Sub-total		X,XXX
4.	Total expenditures as of 30 September 19XX		XX,XXX

OBLIGATIONS AND ESTIMATES

5.	Obligations:		
	a. Sub-contract W/ABC Co., amount not yet paid	X,XXX	
	b. Sub-contract W/DEF Co., amount not yet paid	XXX	
	c. Material ordered but not yet paid for	XXX	
	Sub-total		X,XXX
6.	Estimates of Future Expenditures:		
	a. Estimate of labor required	X,XXX	
	b. Estimate of material required	XXX	
	c. Proposed sub-contracts	XXX	
	Sub-total		X,XXX
	Total		XX,XXX

Enclosure 1

NOTES:

1. All amounts shown above must include overhead, G&A, handling charges, fees, etc.

Specification No. DB-1001

INSTALLATION ENGINEERING DATA

Date form completed _____

(See Remarks at end of form)

Tentative [ ] Valid until _____

Final data [ ]

I. INSTRUMENT
- A. Name of instrument: _____
- B. Manufacturer: _____
- C. Contract number: _____
- D. Delivery date: Tentative: _____ Final: _____

II. PHYSICAL FEATURES
- A. Sub-assemblies:
  1. Number of sub-assemblies: _____
  2. Largest sub-assembly: Weight _____lbs; _____" H x _____" W x _____" D
  3. Heaviest sub-assembly: Weight _____lbs; _____" H x _____" W x _____" D
- B. Assembled instrument:
  1. Number of major components: _____
  2. Largest component: Weight _____lbs; _____" H x _____" W x _____" D
  3. Heaviest component: Weight _____lbs; _____" H x _____" W x _____" D
  4. Total floor space required after assembly, including maintenance access space. ___Ft. ___In. High x ___Ft. ___In. Wide x ___Ft. ___In. Deep.
  5. Total weight of assembled instrument: _____lbs.
- C. Type of base of mount: Flat ____; 3-point suspension ____; 4-point suspension ___
- D. Does the instrument have built-in mobility? Yes ____ No ____
- E. Is the instrument particularly sensitive to vibration? Yes ____ No ____
  Will the instrument generate vibration? Yes ____ No ____
- F. Are any special or unusual tools or fixtures necessary or adviseable for the installation of the maintenance of this instrument? Yes ____ No ____.
  If "Yes," please describe: _____

III. UTILITIES
- A. Electrical:

	AC	DC
1. Voltage	_____Volts / _____Volts	_____Volts / _____
2. Current	_____Amps/phase	_____Amps
3. Frequency	_____cps	
4. Nr. of phases	_____Ph	
5. Nr. of wires	_____	
6. Power required	_____Watts	_____Watts
7. Power factor	_____(Leading) (Lagging)	

  8. Type of outlet: Two prong ___; three prong ___; Twist lock ___; Perm.___
  9. Type of ground: Building conduit ___; Direct earth ground ____.
  10. Should the instrument be shielded, either from external electromagnetic signals or to prevent interference with other equipment? Yes ____No____
  If "Yes," to what extent? _____

B. Air conditioning:
1. Desired environment: Room air temperature of ___ °F / ___ °F and relative humidity of ___% / ___%.
2. Input Air: Is a direct connection necessary? Yes ___ No ___; Adviseable? Yes ___ No ___; If "Yes," what is the connector type and size? _____ Recommended input air temperture ___ °F / ___ °F. Relative humidity ___% / ___%. If input air must be filtered, what is the maximum particle size in microns? ___ What particle count? _____/ cu. ft.
3. Output Air: Is a direct connection to the return air duct necessary? Yes ___ No ___. Adviseable? Yes ___ No ___. Connector type and size? _____. Output air temperature ___ °F / ___ °F. Relative humidity ___% / ___%. Output heat ___BTU/Hr. Flow of ___CFM. Is output air toxic? Yes ___ No ___; Noxious? Yes ___ No ___.

C. Plumbing:
1. Is water required? Yes ___ No ___; Pressure ___PSIG, flow ___GPM.
2. Type of water required:
Tap ___ °F / ___ °F Deionized ___ °F / ___ °F
Tempered ___ °F / ___ °F Filtered ___ °F / ___ °F
If filtered, give maximum permissible particle size in microns and the maximum permissible count. _____ microns _____ particles/cu. ft.
3. Pipe required:
Galvanized ___ Copper ___ Size _____
Stainless Steel ___ Plastic ___ Type of connector _____
4. Floor drain:
Diameter of drain ___ Galvanized drain? ___
Plastic drain? ___ Glass drain? ___
5. Are any chemical solutions used in the device? Yes ___ No ___. If "Yes," state the nature of the solution(s), permissible temperature range, flow rate in appropriate units and the filtration necessary for each solution _____.
6. Size of pipes and connectors _____.

D. Compressed air:
Is compressed air required? Yes ___ No ___. Water free? ___ Oil Free? ___
Type and size of connector? _____. Pressure ___PSIG. Flow in CFM
Maximum ___, minimum ___, average ___.

E. Vacuum:
Is vacuum required? Yes ___ No ___. Pressure ___PSIA or (inches of water) (millimeters of mercure). Displacement in CFM, maximum _____, minimum _____, average _____. Type and Size of connectors _____.

F. Peripheral Devices:
Will the instrument be connected to any peripheral devices such as a computer or data input or data output device? Yes ___ No ___. If "Yes," give, in detail, the nature of the connection to the peripheral device such as coaxial cable, multiple wire connector, etc.

IV. REMARKS
A. Use additional sheets if more space is required for environmental conditions or utilities not mentioned above.
B. Submit three typed copies of the completed form to the Technical Representative.

C. Attach three copies of a dimensioned outline drawing of each major component and of the completed assembly. Include the estimated weight of each major component and of the completed assembly. Indicate, on the outline drawing of the completed assembly, the space required for access to the instrument for maintenance.

D. If a question does not apply to the instrument, insert "N/A" (Not Applicable) in the appropriate blank space.

Information provided by:

_____
(Signature)

_____
(Position or job title)

DESIGN CONCEPT for a Color Control Cell

1. INTRODUCTION

2 BACKGROUND

2.1 Color Product Improvement

2.2 Associated Studies.

3. CONCEPT

3.1 Purpose

3.2 Scope.

4 REQUIREMENTS

4.1 Functions of CCC

4.1.1 Environment Necessary

4.1.2 P.I. Experiments { - Types of PI. - Equipment.

4.1.3 Photo-Scientific Experiments.

4.2 Color Definition.

4.2.1 - Standards

4.2.2 - Techniques

4.2.2.1 Visual < - Colorimeter - Standard Instrumentation

4.2.2.2 Photoelectric

5. MISCELLANEOUS

STAT [redacted]

This is a good thing
piece. It shows a lot
of thought and good
concepts. However it isn't
a D.O. If I were a
contractor I couldn't
bid on it. Please get
together with [redacted] STAT
STAT [redacted] and let's have a
session in my office
on Monday. I know,
this is a rough one. I'll
try to give you more guidance
in the future. P

STAT

D R A F T
12 February 1970

DEVELOPMENT OBJECTIVES
DESIGN CONCEPT for a COLOR CONTROL CELL

1. INTRODUCTION

These development objectives describe requirements to be met in the preparation of a Design Concept for a facility providing the proper environment in which to carry out photo interpretation and photo-scientific experiments on a new family of high resolution, color reconnaissance photography taken at very high altitudes.

2. BACKGROUND

2.1. As a result of great improvements in the imaging characteristics of aerial color film in recent months, increasing amounts of such film are being flown at high altitudes for the assessment of color Essential Elements of Information (EEI's) in military reconnaissance. This trend is expected to accelerate in the next several years as development continues on presently less-than-optimum copy film for reduction of working copies. It is anticipated that product improvement both original and copy material--as

4. REQUIREMENTS. DISCARDS

4.1 ~~CCC~~ Functions.

4.1.1 Environment. The Color Control Cell must be usable to conduct meaningful ~~human factors~~ experiments to define and develop optimized techniques for interpreting and analyzing the new families of color reconnaissance films. To achieve such purposes, ~~it may well be necessary that the~~ selected contractor may determine that illuminations (both environmental and instrument) ~~be~~ should be "modifiable" as to color characteristics. Similarly, ~~work space configurations~~ consideration should be given to convertible work space configurations and surface colors ~~may have to be convertible~~ to permit testing of theoretical arrangements. ~~The application of the Design Concept is expected to be of continuing benefit as new films and techniques for exploitation are developed.~~ In studying this, the response of the human eye and the limits and types of visual anomalies permissable

4,2,3. In summary, for both color identification and color experimentation, the selected contractor must consider these potential factors in developing a viable Design Concept for a PI Color Control Cell:

-- ~~Determine~~ The limits and types of visual anomalies permissable for the task of identifying colors on reconnaissance photography.

-- ~~Determine~~ The influences upon color identifications exerted by variations in (a) PI activities (phases of readout) and (b) Target types.

-- ~~Determine~~ To what tolerances color information should be obtained.

-- ~~Determine~~ The means by which such color information should be transmitted to users.

-- ~~Determine~~ To what extent the specification of color information should be accomplished by humans and/or machines.

-- ~~Determine~~ To what extent optics and light sources of viewing instruments must be modified or newly-developed to best exploit the color films provided.

-- ~~Investigate the theory that~~ To what extent color human adaptation is sufficient for all types of interpretation other than specific color identification tasks.

-- Reconcile the Graphics Arts luminance requirements of less than 500 ft. lamberts for color transparency viewing with PI requirements for 3,000 ft. lamberts on current black and white film; thereby, determine relevance and limits of magnified viewing on color films.

-- Relate the response of the human eye in color film viewing with standard PI image display devices.

-- Determine the effects of using enlarged originals for a substantial part of color film photo interpretation tasks.

4.2.2. Visual - It is anticipated that color identification to varying tole[illegible] would be established standards for viewing and reporting on color EEI's. Therefore, various equipments for making color identifications may well be necessary in/with the subject facility. The contractor for the Design Concept should consider the possibility that many practical color identifications may be feasible with a so-called Visual Tri-Chromatic Colorimeter. The development of such a device might take the form of a modified split field microscope, which could, in effect, contain its own Color Control Cell within itself, thus making it possible for the photo interpreter to carry the Colorimeter into the photo interpretation area. Such a device (which has already been described to this

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office) would require some means of calibrating the illumination of the standard sample portion of the viewing system with the presently varying color characteristics of PI light tables used for assessing the reconnaissance film. another optical technique available in both the PI and other fields, which might be applicable, is alternate occlusion or "flicker".

4.1.3. Photo-Electric - A second, higher level of tolerance for color identifications may require the development of a Photo-Electric Tri-Chromatic Color-imeter. While portability of this device might be desirable, presumably less frequent need for this equipment might indicate a central location within a Color Control Cell, with work flow directed to it. A highly precise Spectro- or Spectral Radiometer photometer may also be necessary for some percentage of color identification tasks. Certainly, such equipment would not be portable, but would be centrally located and operated by specialists. The contractor must consider all of these concepts, but not be limited to them in developing the overall Design Concept. A thorough technology review is indicated, as well as close coordination withthe Sponsor's photo scientists and contractors working on related studies.

4.2. PI Color Control Cell

4.2.1. Color Identification Within the Cell - If it develops that devices cannot be used directly in PI areas for color identification, it is believed that such a "production" function must be developed and tested within a facility in which the walls, ceiling, floor, and work surfaces are optimized as to color and reflectance. Environmental illumination should be similarly optimized. In such a facility, the instruments for displaying color film and making the necessary color identifications may be related to such devices as the Macbeth T&R 240 and PLT-510 or may be modified versions of existing PI light tables, microstereoscopes, and projection viewers.

Insert A

an important sub-task, and perhaps the guiding principle behind the Design Concept, is ~~study of the~~ accomodation for accurate color discrimination and/or identification. In other words, the Color Control Cell should obviate (or eliminate) visual phenomena which would otherwise interfer with accurate ~~film~~ image color identification by the human visual apparatus.

ment for accurate mensuration of photographic images; (d) Developing a plan for training all types of personnel who must exploit color photography.

These studies are not a part of this project; however,

2.3. Progress and findings in each of these studies must be correlated with the Design Concept for the Color Control Cell (CCC). Similarly, the contractor for the CCC will be required to coordinate with the continuing efforts of the manufacturer of the new high resolution color films, which involve unique coating and arrangement of film layers. ~~As time goes by, additional studies will be added,~~ demanding further coordination among contractors, under the control of Government Project Officers.

3. CONCEPT

3.1. Purpose - It is the primary purpose of this study to develop a Design Concept for a facility with which to study the effect of manipulating the environment while conducting PI and photo-scientific tasks. ~~equipments and techniques appropriate for use in accurately identifying colors on aerial reconnaissance film for subsequent analysis. Secondarily, the Design Concept for the Color Control Cell shall accommodate eventual use of the cell for research into human factors and other considerations in scanning, interpreting, and analyzing current and future color film products.~~

Insert A.

3.2. Scope - ~~This study is intended to produce a complete Design Concept for a (facility) with which to, first, identify film colors and, second, study the effect of manipulating the environment and illumination of viewing aids.~~ This study shall produce a thorough report detailing the results of the contractor's analyses ~~and tests of breadboards (as necessary),~~ and defining, in general terms, the physical and functional characteristics of the Color Control Cell and equipment, therein. ~~Subsequent phases of~~ this effort will not include Detailed Designs, ~~Modification~~ and Fabrication, ~~and Test under revised contractual arrangements, likely to include extensive subcontracting.~~ at this time.

-2-

What are you trying to say.